CHEMISTRY

What is the logical way to understand Iso, Sec, Tert and Neo prefixes?

Asked 2 years, 9 months ago Active 2 days ago Viewed 10k times

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I'm only familiar with Alkanes at a basic level currently. What seems logical to me is that an Alkyl molecule with the:

"***iso***" prefix means its an isomer of that alkyl, the usual way i'd see it would be the alkyl group with a substituent (the way an *hexane* could be *isopentane* if I got it right)

as for the "***sec***" prefix, the alkyl group is connected to the main molecule through a secondary carbon (meaning the carbon on the alkyl is bonded with two other carbons in the alkyl, no consideration given to the main chain here)

I find the "***tert***" prefix similar to the latter, it is connected to the maine chain through a tertiary carbon (bonded with three carbons on the alkyl)

I couldn't find a basic logical way to address the definition of the "***neo***" prefix.

Are the ways I described the rest of the prefixes correct?

organic-chemistry nomenclature

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asked Mar 16 '19 at 17:17

Dor

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1 Sec- and tert- are exactly what you say they are. There's no good way to understand the others. Consider that leucine has a isobutyl group, but isoleucine has a sec-butyl group. – Zhe Mar 16 '19 at 17:34

1 chemistry.stackexchange.com/questions/98362/... – Mithoron Mar 16 '19 at 20:04

3 Answers

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The prefixes, iso-, sec-, tert-, neo- are all traditional names when structural organic chemistry was still developing. You have already rationalized all except neo-. Neo- is Greek term for new. I looked up the *OED* etymological dictionary for older meanings, and the earliest use is traced to 1876. Now you can see in no 2, that neo- was a good option.

1. Used in the names of chemical compounds, minerals, etc., which are closely related to, or **new forms of, known substances**. neocatechu n. (Obsolete) a kind of catechu.

2. Used in the names of compounds and radicals in which one carbon atom is linked to four others. Not part of standard chemical nomenclature although well established in

   neohexane and neopentane (and related terms). (a) Categories »

† neo-acid n. Obsolete 1876 W. Odling in London, Edinb., & Dublin Philos. Mag. 5th Ser. 1 216 The names which call to mind that the normal, iso-, and **neo**-acids are mono-, di-, and **trimethyl & etc. derivatives** would seem to be most advantageous.

Neo- even it is used today represents a terminal tert-butyl group, just like the prefix iso- represents a iso-propyl group at the end.

IUPAC names have superseded all.

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answered Mar 17 '19 at 2:23

M. Farooq

30.6k 2 47 99

1 I only regularly see "neo" as a prefix to indicate neopentane derivatives such as neopentylamine – AlmostCatlike Mar 17 '19 at 13:03

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iso neo sec tert prefix are structure descriptors

Chain isomerism (see chapter 4) starts from butane. All isomeric paraffins have same parent name. The names of veop isomers are distinguished by prefixes. (a) Prefix n - is used for those paraffins in which all the carbon atoms are in one continuous chain. The prefix $n - 5tardi$ normal or straight chain.

$$\underset{n\text{-Butane}}{\mathrm{CH_3CH_2CH_2CH_3}},\ \underset{n\text{-Pentane}}{\mathrm{CH_3CH_2CH_2CH_2CH_3}},\ \underset{n\text{-Hexane}}{\mathrm{CH_3CH_2CH_2CH_2CH_2C}}$$

(b) Prefix iso-is used for those paraffins in which methyl group is attached to the second last carbon atom of the continition chain. (c) Prefix neo-is used for those paraffins in which two methyl groups are attached to the second last carbon atomit continuous chain. CC(C)(C)C CCC(C)(C)C CCC(C)(C)C CC(C)(C)CCI There are four types of carbons in the carbon chain. (continuous chain) Neohexyl (i) Primary carbon : A carbon atom attached to one (or no) other carbon atom is termed primary carbon or 1° carbon its (ii) Secondary carbon : A carbon atom attached to two other carbon atoms is termed secondary carbon or 2° carbon (iii) Tertiary carbon : A carbon atom attached to three other carbon atoms is termed tertiary carbon or 3° carbon (iv) Quaternary carbon : A carbon atom attached to four other carbon atoms is termed quaternary carbon or 4° carbor

Primary, Secondary, and Tertiary Carbons. The structural formulas of alkanes contain four types of carbon atoms : (1) A carbon atom attached to one other (or no other) carbon is called primary carbon (l° carbon; l° = primary). (2) A carbon atom attached to two other carbon atoms is called secondary carbon (2° carbon; 2° = secondary). (3) A carbon atom attached to three other carbon atoms is called tertiary carbon (3° carbon; 3° = tertiary). (4) A carbon atom attached to four other carbon atoms is called quaternary carbon (4° carbon; f = quaternary).

Hydrogen atoms attached to $1^{\circ}, 2^{\circ}, 3^{\circ}$ carbon atoms are often referred to as primary, secondary, ind tertiary hydrogen atoms.

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answered 2 days ago
huzaifa abedeen
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Chain isomerisms include the structure descriptors iso, neo, sec, tert, etc. Neo Pentane and iso Pentane are chain isomerisms. Chain isomerism starts from butane. All isomeric paraffins have same parent name. The names of various isomers are distinguished by prefixes.

- Prefix n It is used for those paraffins in which all the carbon atoms are in one continuous chain. The prefix n stands for normal or straight chain.

$$\underset{n\text{-Butane}}{\mathrm{CH_3CH_2CH_2CH_3}},\ \underset{n\text{-Pentane}}{\mathrm{CH_3CH_2CH_2CH_2CH_3}},$$
$$\underset{n\text{-Hexane}}{\mathrm{CH_3CH_2CH_2CH_2CH_2CH_3}}$$

- Prefix *iso* It is used for those paraffins in which methyl group is attached to the second last carbon atom of the contintion chain.
- Prefix *neo* It is used for those paraffins in which two methyl groups are attached to the second last carbon atomit continuous chain.

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The prefixes n means normal, *iso* (from Greek ísos) means equal, *neo* (Greek néos = young) means new, *sec* means secondary, and *tert* means tertiary. The following reaction pathway for neopentane conversion, as an example, is a logical way to understand Iso, Sec, Tert, and Neo prefixes.

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The structural formulas of alkanes contain four types of carbon atoms (Primary, Secondary, and Tertiary Carbons.):

1. A carbon atom attached to one other (or no other) carbon is called primary carbon (1° carbon; 1° = primary).
2. A carbon atom attached to two other carbon atoms is called secondary carbon (2° carbon; 2° = secondary).
3. A carbon atom attached to three other carbon atoms is called tertiary carbon (3° carbon; 3° = tertiary).
4. A carbon atom attached to four other carbon atoms is called quaternary carbon (4° carbon; (4° = quaternary).

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huzaifa abedeen
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